

Applicant : Thomas A. Froeschle et al.
Serial No. : 10/810,538
Filed : March 26, 2004
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Attorney's Docket No.: 02103-212001

Amendments to the Drawings:

The attached replacement sheets of drawings includes changes to Fig. 1A-B, 2A-H, 3A-C, 4A-D, 4G-I, 5A-C, and 6-8 and replace the original sheets including Fig. 1A-B, 2A-H, 3A-C, 4A-D, 4G-I, 5A-C, and 6-8.

Attachments following last page of this Amendment:

Replacement Sheets (17 pages)

REMARKS

The comments of the applicant below are each preceded by related comments of the examiner (in small, bold type).

More specifically, the Applicants' traversal on the election/restriction requirement is not persuasive, the election/restriction requirement remains the same as being set forth in the Office Action mailed on 05/03/2005.

Without conceding the examiner's position, the claims have been canceled.

1. The disclosure is objected to because of the following informalities: - " armature assembly 64 " through the whole Specification (e.g. in line 8, Page 74) should be -- armature assembly 66 --. Appropriate corrections are required. The same requirement has been set forth in the Office Action mailed on 05/03/2005.

The specification has been amended.

Drawings

2. This Office acknowledges the replacement drawing sheets of Figs. 4E-4F received on 08/05/2005, however, the corrected drawing sheets of other objected drawings, as being set forth on the Draftperson's Patent Drawing Review (PTO-948, a copy of which is attached to the Office Action mailed on 05/03/2005), in compliance with 37 CFR 1.121 (d) are required in reply to the Office action to avoid abandonment of the application. ... The objection to the drawings will not be held in abeyance.

Amended drawing sheets for all the remaining figures are attached.

Claim Objections

3. Claim 13 is objected to because of the following informalities: - " parallel 1 " in claim 14 should be -- parallel --. Appropriate correction is required. The same requirement has been set forth in the Office Action mailed on 05/03/2005.

Claim 14 has been amended.

5. Claims 1-2,4-9, 11-19, 21,32, 35, and 44-47 are rejected under 35 U.S. C. 102(b) as being anticipated by Hoppie (US Patent 6,039,014).

Hoppie discloses an electromagnetic actuator (See Figs 1-5, and 7), comprising: a stator assembly (50; 120; 164) having an inner surface that defines an opening, the stator assembly comprising: a coiled conductor (52; 126; 162) disposed near the inner surface of the stator assembly, wherein the coiled conductor is adapted to generate a first magnetic field when current is applied; a center pole formed of a material (60; 118; 192) having high magnetic permeability and having a longitudinal axis; and an armature assembly (56; 112; 174) at least partially disposed within the stator assembly opening, the armature assembly comprising: a permanent magnet (58; 116; 190), wherein the armature assembly moves in a direction parallel to the longitudinal axis of the center pole when current is applied to the coiled conductor assembly;

Furthermore, regarding the Attorney's contention "a center pole formed of material having high magnetic permeability," a feature absent from the reference " (e.g., See

Page 4, Attorney's Remarks), the Examiner disagrees. As a matter of fact, the Hoppie reference discloses a center pole formed of a ferromagnetic material (60; 118; 192), ... in addition, it is also admitted in this instant application, " a material having high magnetic permeability (e.g., a ferromagnetic or paramagnetic material) " (See line 11 through line 12, Page 1 of the Specification). Accordingly, the Examiner would deem that either one of the Hoppie reference, the Grundl reference, or the Kawamura reference teaches a center pole formed of material having high magnetic permeability.

Hoppie's vocabulary, though similar to the words used in claim 1, uses the words to describe different elements than the ones to which claim 1 refers. In Hoppie, the "armature assembly 50" is stationary while it is the stator of claim 1, for example, that refers to the stationary element. In Hoppie, it is the "field assembly 56 ... [that moves] relative to armature assembly 50" (see col. 4, ll. 7-19) while it is the armature in claim 1 that moves. Hoppie neither describes nor would have made obvious a center pole as in claim 1, regardless of its material.

None of the items identified by the examiner (60, 118, 192) are a center pole. The ferromagnetic material 60 is part of field assembly 56, which is secured to shaft 62 and valve stem 64 "such that reciprocating motion of field assembly 56 results in corresponding reciprocating motion of valve stem 64 to open and close valve 30," (col. 4, ll. 36-41). Ferromagnetic elements 118 and 192 are part of field assemblies including shafts that are or that connect to the valve stem (col. 6, ll. 32-35; col. 8, ll. 1-6), and relate to the armature, not the center pole, of claim 1.

6. Claims 1-2,409, 11-19, 21, 25-26, 31-32, and 35 are rejected under 35 U.S.C. 102(e) as being anticipated by Grundl et al. (US Patent 6,755,161).

Grundl discloses an electromagnetic actuator (See Figs 1 -6), comprising: a stator assembly (40) having an inner surface that defines an opening, the stator assembly comprising: a coiled conductor (18', 28) disposed near the inner surface of the stator assembly, wherein the coiled conductor is adapted to generate a first magnetic field when current is applied; a center pole (18", 18'') formed of a material having high magnetic permeability and having a longitudinal axis; and an armature assembly (16) at least partially disposed within the stator assembly opening, the armature assembly comprising: a permanent magnet (30), wherein the armature assembly moves in a direction parallel to the longitudinal axis of the center pole when current is applied to the coiled conductor assembly;

the Grundl reference discloses a center pole formed of a soft magnetic form body 18", 18''' (See Col. 9, line 64 through line 66),

Grundl clearly states that the "form bodies 18", 18"" are part of the stator 18. (col. 9, ll. 60-64) The valve assembly in Grundl uses a "rotor" that is "a hollow cylinder" around the stator (col. 10, ll. 19-20), but Gundl has no element that corresponds to the center pole of claim 1.

8. Claims 1-2, 4-9, 11-16, 19, 21, 32, 35, and 44-47 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawamura (US Patent 5,124,598).

Kawamura discloses an electromagnetic actuator (See Figs1 -2), comprising: a stator assembly (3) having an inner surface that defines an opening, the stator assembly comprising: a coiled conductor (36-39) disposed near the inner surface of the stator assembly, wherein the coiled conductor is adapted to generate a first magnetic field when current is applied; a center pole (71) formed of a material having high magnetic permeability and having a longitudinal axis; and an armature assembly (22, 23) at least partially disposed within the stator assembly opening, the armature assembly comprising: a permanent magnet (2), wherein the armature assembly moves in a direction parallel to the longitudinal axis of the center pole when current is applied to the coiled conductor assembly;

and the Kawamura reference discloses a center magnetic pole 71,

Kawamura's reference to "an upper magnetic pole 71" uses the word "pole" in its magnetic sense, referring to the orientation of a magnetic field. In claim 1 the pole is a structural element. (An example is set forth in applicant's specification at p. 6, ll. 23-25: "The center pole 28 is a hollow, tube-like structure that extends beyond the outer housing 29 and acts as a guide for a valve stem ... attached to the armature assembly") As with the other references, Kawamura has only a stator (electromagnet 3) and an actuator (magnet 2 and magnetic member 21 attached to exhaust valve 1). Kawamura neither describes nor would have made obvious a center pole.

7. Claims 48-52 are rejected under 35 U.S. C. 1 02(b) as being anticipated by Hoppie (US Patent 6,039,014).

Hoppie discloses ... a center pole formed of a material (60; 118; 192) having high magnetic permeability and having a longitudinal axis ...

9. Claims 48-52 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawamura (US Patent 5,124,598).

Kawamura discloses ... a center pole (71) formed of a material having high magnetic permeability and having a longitudinal axis ...

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Claims 48 is patentable for at least the same reasons for which claim 1 is patentable.

Claims 49 through 52 and all other dependent claims are patentable for at least the reasons for which the claims on which they depend are patentable.

Please apply any other charges or credits to deposit account 06-1050, Order No. 02103-212001.

Date: _____

1/5/6

Respectfully submitted,



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